

**STRUCTURE AND METHOD FOR FABRICATING SEMICONDUCTOR  
STRUCTURES AND DEVICES UTILIZING THE FORMATION OF A  
COMPLIANT SUBSTRATE COMPRISING AN OXYGEN-DOPED  
COMPOUND SEMICONDUCTOR LAYER**

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**Abstract of the Disclosure**

High quality epitaxial layers of monocrystalline materials can be grown overlying monocrystalline substrates such as large silicon wafers by forming a compliant substrate for growing the monocrystalline layers. An accommodating buffer layer is lattice matched to the overlying monocrystalline material layer. In addition, formation of a compliant substrate may include utilizing a monocrystalline oxygen-doped material layer. The monocrystalline oxygen-doped material layer may prevent contamination of the accommodating buffer layer and may facilitate isolation of devices formed in the overlying monocrystalline material. Further, the monocrystalline oxygen-doped materials may be highly resistive and could reduce or eliminate backgating and sidegating effects.

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